stenotic orifice area (SOA) in aortic stenosis (AS) requires careful LV outflow tract (LVOT) diameter measurement and pulsed Doppler (PD) recording of LVOT flow profile. We examined the potential of a new simpler method, automated stroke volume calculation (ACM) in determining AS severity.

Methods: We studied 31 pts (age 66 ± 9 yrs), immediately prior to catheterization employing ACM, a region of interest was placed within the color sector across the LVOT in the apical 5 chamber view during systole. Stroke volume was automatically calculated by double integration of Doppler signals in space and in time assuming hemiaxial symmetry: $\int\int \pi rv\,(r,t)\,dr\,dt$. SOA was then calculated integrating this derived SV (averaged from 3–5 beats) into the CE: AVA = SV/$\int$ vel (AS). The ACM derived SOA was compared to that from GORLIN method.

Results: SOA ranged from 0.5 to 2.12 cm^2 by GORLIN and from 0.4 to 2.11 cm^2 by ACM. There was a close correlation between invasive and ACM methods: $y = 0.88x + 0.06$, $r = 0.87$, SEE = 0.20 cm^2, $p < 0.0001$. For determination of significant AS (< 1.0 cm^2), Sens. was 89% and Spec. was 75%.

Conclusion: ACM is a simple and promising new technique to determine the SOA in AS pts. It overcomes the disadvantage of conventional 2D echo and PD by avoiding potential errors in the determination of the LVOT diameter and flow profile.

1230-115 TEE With 3 D Reconstruction Reveals Organic Tricuspid Valve Disease in Patients With Severe Valve Regurgitation and Apparently Normal Cusp Morphology

M.Y. Henein, C.A. O'Sullivan, A.J.S. Coats, D.G. Gibson. *Royal Brompton Hospital, London, UK, USA*

Severe tricuspid regurgitation (TR) is well recognised as a long term complication of rheumatic mitral valve replacement (MVR), impairing the functional results of surgery. However, its exact basis remains unclear and its management is unsatisfactory. We therefore studied 10 patients, 9 female, age 67 ± 10 yrs, 8 ± 2 years after MVR by transesophageal echo (TEE) with 3 D reconstruction. All had normal mitral prosthesis function but impaired exercise tolerance and marked fluid retention. Transthoracic echo-Doppler showed enlarged right atrium (RA) and right ventricle (RV), a mean RV-RA pressure drop of 14 ± 4 mmHg and apparently normal cusp anatomy. TEE and 3D reconstruction, however, demonstrated abnormal cusp anatomy in all patients, with restricted cusp motion in 5, and cusp shortening and thickening in the remainder, suggesting rheumatic involvement. Although diastolic transtricuspid velocities were increased in all patients due to increased stroke volume (peak 1.0 m/s), significant tricuspid stenosis was present in 2 patients (mean gradient 4 and 3 mmHg).

Conclusion: Rheumatic cusp involvement contributes to severe tricuspid regurgitation occurring long term after mitral valve replacement, although overt stenosis is uncommon. Knowledge of the structural basis of this condition may thus improve its long term management.

1230-116 Respirophasic Two-dimensional Echocardiographic Signs Are Highly Sensitive and Specific for Pericardial Constriction

S.J. Fry, I.F. Palacios, C.W. Akins, R.A. Levine. *Massachusetts General Hospital, Boston, MA, USA*

Background: Two-dimensional echocardiography (2-DE) has been widely viewed as lacking sensitivity and specificity for the diagnosis of constrictive pericarditis. However, previous studies have not utilized the full spatial appreciation of 2-DE to explore the same respirophasic features of physiology that are recorded by Doppler, including respiratory changes in septal radius of curvature and LV internal diameter. We sought to determine the sensitivity and specificity for constriction of these 2-DE respirophasic signs, which reflect heightened interventricular dependence within the pericardium.

Methods: Patients with suspected constrictive pericarditis were identified in the databases of the cardiac catheterization laboratory and the cardiac surgery division. Pericardial constriction was demonstrated by right heart catheterization (RHC) or intraoperative visual assessment in 25 patients; 10 patients in whom RHC was negative for constriction were used as controls. Transthoracic echocardiograms performed prior to RHC or pericardiectomy were reviewed. Respirophasic changes in end-diastolic LV internal diameter (parasternal long axis), interventricular septal radius of curvature (parasternal short axis), and interventricular septal concavity toward LV or RV (four chamber) were recorded. Abrupt early diastolic cessation of left ventricular posterior expansion, diastolic septal oscillation, and pericardial thickness were also recorded.

Results: Four 2-DE signs were found to have excellent sensitivity, specificity, and predictive values for the diagnosis of constriction.

	Sensitivity	Specificity	PPV	NPV
Inspiratory reduction in LVID ≥8%	96%	90%	96%	90%
Inspiratory increase in septal RC ≥36%	100%	100%	100%	100%
Inspiratory septal concavity toward RV	96%	100%	100%	91%
Abrupt cessation of posterior LV expansion	100%	90%	96%	100%

LVID = LV internal diameter RC = Radius of curvature PPV = Positive predictive value NPV = Negative predictive value

Conclusion: Constrictive pericarditis can be diagnosed by 2-DE with high sensitivity and specificity of multiple signs, particularly those that reflect the respirophasic physiology of constriction.

1230-117 Quantification of Regional and Global Shape Abnormalities of Remodeled Right Ventricle in Patients With Atrial Septal Defect Using a New Approach of Echocardiographic Shape Analysis

A.K. Jacques, M. Arsenault, E. Avelar, M. Vannan, G. Marx, N. Pandian. *Tufts-New England Medical Center, Boston, Mass, USA*

Background: RV exposed to chronic volume overload from an atrial septal defect (ASD) sustains geometric alterations. Although such shape changes have prognostic implications, they have never been well-characterized.

Methods: To assess changes in regional and global RV geometry in ASD, we applied quantitative shape analysis to 2-D echo studies of 25 pts with known ASDs (Qp/Qs: 1.8 ± 0.2) and comared the data to that from 21 age-matched normals (N). Using a dedicated computer software, diastolic (D) and systolic (S) endocardial RV outlines from 4 chamber view (4CV) and short-axis view (SAX) were analyzed and indices of global RV shape (Fourier Power Index or PI, unitless) and of regional shape (curvature or C, unitless) were derived.

Results: (mean ± SE, $p < 0.05$). RV dimension (mm) was bigger in ASD than in N (N: 16.7 ± 1 vs ASD: 25.5 ± 2'). In 4C view, RV in ASD pts was rounder (Lower PI) in D and more so in S. (D: N: 25 ± 1.7 vs ASD: 20 ± 1.7'; S: N:29 ± 2 vs ASD: 22 ± 2'). Free wall was more curved during S (N: 6.1 ± 0.7 vs ASD: 8.9 ± 1'), and septum was more bowed towards the RV (N: 2 ± 0.5 vs 3.7 ± 0.6'). SAX revealed blunting of free-wall/septal junctions (decreased C values) in ASD pts in S and D. Septal flattening in D (N: 3.9 ± 0.5 vs ASD: 1.6 ± 0.6') and resumption of normal septal curvature in S were noted.

Conclusion: Quantitative shape analysis provides an objective approach to appraise regional and global RV shape changes in ASD and could aid in studies of RV pathophysiology in other volume overload states.

1230-118 Identification of Scuba Divers With Patent Foramen Ovale at Risk for Decompression Sickness

D. Cartoni, S. DeCastro, G. Valente, C. Costanzo, S. Beni, A. Pelliccia, C. Balestra, L.V. Serdoz, F. Fedele. *"La Sapienza" University, Istituto di Scienza dello Sport Rome, Italy*

While patent foramen ovale (PFO) has found in up to 30% of healthy population, decompression sickness (DS) develops in a relative low number of divers. To identify the echocardiographic findings of PFO divers at higher risk for DS, we engaged 41 trained scuba divers (36 M and 5 F, mean age 32 ± 8 yrs) with rest and Valsalva saline contrast transthoracic (TTE) and transesophageal echocardiography (TEE). Fossa ovalis diameter (FoD), fossa ovalis membrane length (ML) and mobility (MM), patency diameter (PFOD) and max no. of shunted microbubbles (Mcb) were measured. Contrast TEE detected a PFO in 14/22 (63%, Gr. A) divers with DS and in 5/19 (26%, Gr. B) divers without DS ($p = 0.03$). Contrast TTE identified 14/19 PFO divers (sensibility 73%, specificity 100%).

	Gr. A (n = 14)	Gr. B P (n = 5)	
PFO at rest	11 (78%)	-	0.01
FoD (mm)	15.9 ± 3.7	18.2 ± 3.5	0.2
ML (mm)	26.2 ± 3.8	29.3 ± 3.9	0.1
MM (mm)	3.4 ± 2.4	2.1 ± 1.5	0.2
PFOD (mm)	1.8 ± 0.9	1.1 ± 0.5	0.1
Mcb	30 ± 27	14 ± 6	0.2

Conclusions: Scuba divers with DS present a high PFO prevalence. Right-to-left shunting at rest seems to identify those PFO divers at higher risk for DS. Contrast TTE appears a feasible and usefull screening tool for scuba diving fitness.